

CENGSM

a joint venture of



**Constellation
Energy**



CALVERT CLIFFS NUCLEAR POWER PLANT

March 20, 2014

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 2; Docket No. 50-318; License No. DPR 69
Licensee Event Report 2014-001, Revision 00
Reactor Trip Due to Inadequate Protection Against Weather Related Water Intrusion

The attached report is being sent to you as required by 10 CFR 50.73.

There are no regulatory commitments contained in this correspondence.

Should you have questions regarding this report, please contact Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

A handwritten signature in black ink, appearing to read "Mark D. Flaherty".

Mark D. Flaherty
Plant General Manager

MDF/CAN/bjd

Attachment: As stated

cc: N. S. Morgan, NRC
W. M. Dean, NRC

Resident Inspector, NRC
S. Gray, DNR

Handwritten: IE22
NRK

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Calvert Cliffs Nuclear Power Plant, Unit 2

2. DOCKET NUMBER

05000 318

3. PAGE

1 OF 6

4. TITLE

Reactor Trip Due to Inadequate Protection Against Weather Related Water Intrusion

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	21	2014	2014	- 001 -	00	03	20	2014	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)

1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

C. A. Neyman, Senior Engineering Analyst

TELEPHONE NUMBER (Include Area Code)

410-495-3507

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	EA	FLT	W120	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On January 21, 2014, at 9:25 p.m., Unit 2 experienced an automatic reactor trip from 99.5 percent power. The reactor trip occurred when 13 kV Service Bus 21 deenergized due to a ground fault on feeder breaker 252-2104. The loss of the service bus caused a loss of power to non-safety-related 4 kV buses, which caused a loss of circulating water pumps and main condenser vacuum, requiring the use of auxiliary feedwater and atmospheric dump valves to maintain Reactor Coolant System temperature. Power was also lost to safety-related 4 kV Bus 24, which caused an automatic start of the 2B Emergency Diesel Generator to power 4 kV Bus 24.

The loss of power to non-safety-related 13 kV Service Bus 21 was caused by water intrusion when an air filter assembly located at the back of breaker 252-2104 cubicle became dislodged during a snow storm, allowing snow to enter the cubicle, melt, and cause a ground fault. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to Reactor Protective System actuation and the automatic start of the 2B Emergency Diesel Generator. Corrective actions include repairs to 13 kV Service Bus 21 and installation of a new filter housing. Previous events related to safety-related structures have been documented in Licensee Event Reports 317/2010-001 and 317/2011-003.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Calvert Cliffs Nuclear Power Plant, Unit 2	05000 318	YEAR	SEQUENTIAL NUMBER	REV NO.	3 of 6
		2014	-- 001 --	00	

NARRATIVE**D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:**

The reactor trip occurred on January 21, 2014, at 9:25 p.m.

Operators implemented Emergency Operating Procedure (EOP)-0, Post-Trip Immediate Actions, and performed post-trip immediate actions.

Operators entered Technical Specification 3.8.1 condition A for loss of one of two offsite power sources.

At 9:57 p.m., operators implemented EOP-1, Reactor Trip, to perform post-trip recovery actions.

At 11:23 p.m., operators paralleled the 2B EDG to off-site power. Power to 4 kV Bus 24 is now being provided by an alternate feeder.

On January 22 at 0:32 a.m., power was restored to 4 kV Buses 22, 23, 25, and 26.

At 0:33 a.m., the Nuclear Regulatory Commission (NRC) was notified.

At 1:07 a.m., operators implemented Operating Procedure-4, Plant Shutdown from Power Operation to Hot Standby.

On January 24 at 8:47 p.m., 13 kV Service Bus 21 was reenergized.

At 9:25 p.m., operators entered Technical Specification 3.8.1 condition J for failure to meet the 72 hour requirement to exit Technical Specification 3.8.1 condition A.

At 9:58 p.m., operators exited Technical Specification 3.8.1 conditions A and J for loss of one offsite power source. Total elapsed time of inoperability was 72 hours and 33 minutes.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

Letdown flow in the Chemical and Volume Control System was lost due to the loss of power. It was later restored using EOP-1.

The loss of power to the circulating water pumps resulted in a loss of main condenser vacuum. Due to the duration of the loss of power, a low pressure turbine rupture disc ruptured as designed due to the elevated main condenser pressure. Heat removal was initially achieved using the Auxiliary Feedwater System and atmospheric dump valves.

F. METHOD OF DISCOVERY:

The event was self-revealing.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Calvert Cliffs Nuclear Power Plant, Unit 2	05000 318	YEAR	SEQUENTIAL NUMBER	REV NO.	4 of 6
		2014	-- 001 --	00	

NARRATIVE**G. MAJOR OPERATOR ACTION:**

The loss of main condenser vacuum resulted in a loss of normal heat removal for the Reactor Coolant System (RCS). Heat removal was initially achieved using the Auxiliary Feedwater System and atmospheric dump valves.

H. SAFETY SYSTEM RESPONSES:

The Reactor Protective System, Emergency AC Power System, and Auxiliary Feedwater Systems operated as designed. There were no Safety System Functional Failures.

II. CAUSE OF EVENT:

The event is documented in station condition report number CR-2014-000569. The event occurred when a winter storm was in progress that consisted of blowing snow and wind speed of approximately 20 miles per hour. The 13 kV Service Bus 21 is located in an outdoor weatherproof metal structure. Two air filters located on the back of 13 kV Service Bus 21 feeder breaker 252-2104 became dislodged such that a corner of one of the filters bent over, allowing snow to enter through the vent and accumulate. A heater housed within the feeder breaker 252-2104 cubicle melted the snow, allowing water to contact the "A" phase bus and cause a ground fault. This resulted in a loss of power to 13 kV Service Bus 21. The root cause was determined to be the outdoor 13 kV metal clad switchgear louver and filter configuration did not provide adequate protection against weather related water intrusion because the weather condition was not anticipated. The contributing cause was a latent deficiency of the switchgear rear door filter housing assembly that went unrecognized.

III. ANALYSIS OF EVENT:

The event resulted in valid actuations of the Reactor Protective System and the 2B EDG. The actuations were not part of a pre-planned sequence during testing or reactor operation. Therefore, the event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A). Immediate notification of the event (Event Number 49754) was made on January 22, 2014 at 00:33 a.m. in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A).

Inoperability of one off-site power source occurred at the time the ground fault developed on 13 kV Service Bus 21. The power source remained inoperable for 72 hours and 33 minutes. During this time, off-site power continued to be provided by 13 kV Service Bus 11.

The NRC Performance Indicator for Unplanned Scrams per 7,000 critical hours is projected to increase to approximately 2.8 and remain green. The NRC Performance Indicator for Unplanned Scrams with Complications is projected to increase to 1 and remain green.

This event did not result in any actual nuclear safety consequences. The loss of non-emergency AC power event is analyzed in Section 14.10 of the Calvert Cliffs' Updated Final Safety Analysis Report. The most limiting LOAC event is a loss of turbine load at hot full power

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
		2014	-- 001 --	00	
Calvert Cliffs Nuclear Power Plant, Unit 2	05000 318				5 of 6

NARRATIVE

with offsite AC power unavailable. In the event described in Chapter 14.10, there is a loss of RCS flow and atmospheric dump valves. In the January 21, 2014 event, reactor coolant pumps continued to operate and atmospheric dump valves remained available for RCS heat removal. The event is bounded by the Section 14.10 safety analysis. An estimated conditional core damage probability of 5.2E-06 was calculated for this event.

IV. CORRECTIVE ACTIONS:**A. ACTION TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:**

1. The 13 kV Service Bus 21 insulation that was damaged by the ground fault was repaired.
2. The new filter housing with additional bracing support was fabricated and installed on feeder breaker 252-2104.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

1. Temporary covers were installed over the middle (if installed) and upper louvers on the rear of both Unit 1 and Unit 2 13kV outdoor metal clad switchgear doors to minimize the probability for snow to enter into the louvers.
2. Design and install a permanent solution for an exterior housing over metal clad louvers to provide a more robust barrier against the environment.

V. ADDITIONAL INFORMATION:**A. FAILED COMPONENTS:**

Outdoor 13 kV metal clad switchgear louver and filter assembly was manufactured by Westinghouse Electric Corporation (EPIX Identification Number W120).

B. PREVIOUS LERs ON SIMILAR EVENTS:

Calvert Cliffs Unit 1 experienced an automatic reactor trip on January 18, 2010, due to water intrusion through a safety-related roof into switchgear protective circuitry. This event was documented in LER 317/2010-001. The associated root cause analysis determined that the station lacked sensitivity to the consequences associated with degraded roof conditions. Corrective actions to prevent recurrence focused on preventive measures and preventive maintenance for roof issues.

Calvert Cliffs Unit 1 experienced an inoperability of the 1A EDG on October 21, 2011, due to water intrusion through a floor drain. This event was documented in LER 317/2011-003. The extent of condition considered safety-related critical equipment and equipment that was exposed to the elements. The event is different than the previous

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Calvert Cliffs Nuclear Power Plant, Unit 2	05000 318	YEAR	SEQUENTIAL NUMBER	REV NO.	6 of 6
		2014	-- 001 --	00	

NARRATIVE

two events in that the 13kV Bus 21 is not safety-related and is located in a weatherproof metal structure that was expected to protect the bus from the elements per its original design.

**C. THE ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) COMPONENT
FUNCTION IDENTIFIER AND SYSTEM NAME OF EACH COMPONENT OR SYSTEM
REFERRED TO IN THIS LER:**

COMPONENT	IEEE 803 FUNCTION ID	IEEE 805 SYSTEM ID
Outdoor 13 kV metal clad switchgear louver and filter assembly	FLT	EA
13 kV Service Bus 21	BU	EA
Circuit Breaker 252-2104	BKR	EA
EDG 2B	DG	EK

D. SPECIAL COMMENTS:

None